

REMARKS/ARGUMENTS

Claims 8-11 remain pending herein.

It is respectfully submitted that entry of the above amendments would be proper under 37 C.F.R. §1.116 since the amendments (1) address a rejection under 35 U.S.C. §112, first paragraph and, for the reasons discussed below, eliminate that issue; (2) do not raise any new issues requiring further search and/or consideration; and (3) for the reasons discussed below, place this application in condition for allowance. Entry of the above amendments is therefore respectfully requested.

Claim 8 was rejected under 35 U.S.C. §112, first paragraph. The December 8, 2004 Office Action contains a statement that there is no support in the present specification for recitation that the space between the inner reactor and the outer reactor is evacuated and maintained in vacuum. In response, recitation in claim 8 of "a space between the inner reactor and the outer reactor being evacuated and maintained in vacuum" has been deleted. Claim 8 has been amended as set forth above to recite "an evacuation system in communication with a space between the inner reactor and the outer reactor." It is respectfully submitted that this inserted recitation is supported by disclosure in the present application of a second evacuation system 45 which communicates with the outer reactor 32 (see Fig. 4), as disclosed in paragraph [0052]. In addition, claim 8 has been amended to insert "using a chloride-based gas" after recitation of "a Hydride Vapor Phase Epitaxy method". It is respectfully submitted that the specification provides support for this insertion at numerous locations.

In view of the above, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 8-11 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,533,874

(Vaudo '874) in view of Japanese 2-34592 (JP '592), further in view of U.S. Patent No. 5,614,249 (Mayeda '249) or U.S. Patent No. 5,728,940 (Kim '940).

The present invention is directed to an apparatus for fabricating a III-V nitride film on a substrate, the apparatus comprising a double reactor structure. The double reactor structure includes an inner reactor and an outer reactor which surrounds and is spaced from the inner reactor. The double reactor structure further includes an evacuation system in communication with the space between the inner reactor and the outer reactor. The apparatus further comprises a gas leak-detecting means which detects gas leaks between the inner reactor and the outer reactor.

Vaudo '874 discloses a method of forming a nitride base layer on a substrate. Vaudo '874 discloses an HVPE reactor 52 comprising a reactor housing defining an interior reactor volume 54, the reactor having feed ports 72, 74, 76 and 78 (Vaudo '874, Fig. 2; Column 10, lines 55-60). A substrate 56 for the growth of the nitride base layer is mounted on a support 60 (Vaudo '874, column 11, lines 1-3).

The Office Action contains an acknowledgment that Vaudo '874 does not teach an inner reactor and outer reactor being spaced from one another. The Office Action contains an assertion that in view of JP '592, it would have been obvious to modify Vaudo '874 by incorporating a quartz liner disclosed in JP '592.

JP '592 discloses a method for growing a compound semiconductor single crystal. Referring to Fig. 1 of JP '592, which shows an example of a device used for the method according to JP '592, a quartz liner tube 18 is provided outside a quartz ampoule 11. JP '592 discloses that both ends of the quartz liner tube 18 are sealed to prevent countercurrent heat transfer at a high pressure (JP '592, English Translation, page 7, first paragraph), clearly indicating that the space between the quartz ampoule 11 and the quartz liner tube 18 is

maintained in a high pressure, not in vacuum. In addition, the raw material which is positioned within the quartz ampoule 11 is heated and melted by the electric furnace 17, which is disposed outside the quartz liner tube 18. This further demonstrates that the space between the quartz ampoule 11 and the quartz liner tube 18 is not maintained in vacuum, because if such space were maintained in vacuum, the heat from the furnace 17 would be unable to reach the quartz ampoule 11, such that the raw material would not be able to be melted.

Furthermore, the Office Action contains an assertion that it would have been obvious to modify Vaudo '874 to include the quartz liner tube 18 of JP '592 because "a liner tube between a reactor and a heater ensures uniform heating of the reactor." JP '592, however, nowhere discloses that the liner 18 provides uniform heating of the quartz ampoule 11 of JP '592 -- in fact, the process according to JP '592 relies on establishing and maintaining a temperature *gradient* in order to grow a single crystal (see JP '592, paragraph bridging pages 2 and 3; and the paragraph bridging pages 9 and 10).

In addition, the Office Action contains an acknowledgment that Vaudo '874 and JP '592, taken individually or in combination, do not disclose a gas leak detecting means. The Office Action contains an assertion that it would have been obvious to modify a combination of Vaudo '874 and JP '592 with a leak detection system of Mayeda '249 or a leakage detector of Kim '940. Mayeda '249 discloses detecting a gas leak of a CVD apparatus, but does not disclose or suggest detecting a gas leak in the space of a double reactor structure which is formed by an inner reactor and an outer reactor. Similarly, Kim '940 does not disclose or suggest detecting gas leaks between an inner and an outer reactor.

Furthermore, in the present invention, the intended III-V nitride film is formed by means of HVPE, and so a chloride-based gas is employed. When a chloride-based gas is used

in a high temperature, the gas may corrode the reactor wall. In accordance with the present invention, a double reactor structure is employed so that if the inner reactor becomes corroded by the chloride-based gas, the chloride-based gas and other gases are not leaked from the outer reactor, i.e., are not leaked from the total reactor system. In the applied reference, there is no disclosure of using a HVPE method, and as a result, the possible corrosion of the reactor walls by chloride-based gas, and consequent leakage of chloride-based gas, would not be faced.

For each of the above-described reasons, it would not have been obvious in view of the applied references, to provide a device which falls within the scope of the present claims. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,



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